

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: ) Confirmation No.: 4693  
Koichiro TANAKA et al. ) Examiner: Chuong A. Luu  
Serial No. 10/787,120 ) Group Art Unit: 2892  
Filed: February 27, 2004 )  
For: LASER IRRADIATION METHOD, )  
LASER IRRADIATION APPARATUS, )  
AND METHOD FOR )  
MANUFACTURING )  
SEMICONDUCTOR DEVICE )

**RESPONSE**

Honorable Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

The Official Action mailed June 25, 2009, has been received and its contents carefully noted. This response is filed within three months of the mailing date of the Official Action and therefore is believed to be timely without extension of time. Accordingly, the Applicant respectfully submits that this response is being timely filed.

The Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on November 4, 2004; February 17, 2005; March 1, 2005; July 26, 2005; November 2, 2005; March 21, 2006; April 4, 2006; September 8, 2006; December 22, 2006; January 5, 2007; June 22, 2007; October 16, 2007; August 22, 2008 and March 5, 2009.

SECOND REQUEST: A further Information Disclosure Statement was submitted on December 11, 2008 (received by OIPE on December 12, 2008) and consideration of this Information Disclosure Statement is respectfully requested.

A further Information Disclosure Statement was submitted July 7, 2009, and consideration of this Information Disclosure Statement is respectfully requested.

Claims 7, 8, 10-13 and 15-24 are pending in the present application, of which claims 7, 8, 12, 13, 18 and 19 are independent. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

The Official Action rejects claims 7, 8, 10 and 22 as anticipated by U.S. Patent No. 6,803,296 to Miyairi. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of anticipation.

As stated in MPEP § 2131, to establish an anticipation rejection, each and every element as set forth in the claim must be described either expressly or inherently in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The Applicant respectfully submits that an anticipation rejection cannot be maintained against the independent claims of the present application. Independent claims 7 and 8 recite irradiating the surface with a second laser beam concurrently with the elongated beam. For the reasons provided below, the Applicant respectfully submits that Miyairi does not teach the above-referenced features of the present invention, either explicitly or inherently.

The Official Action asserts that Miyairi discloses "irradiating the surface with a second laser beam concurrently with the elongated beam ... (see column 10, line 35 through column 12, line 16. Figures 1-5)" (Paper No. 20090616, page 3). The Applicant respectfully disagrees and traverses the above assertion of the Official Action.

Miyairi discloses that "first laser light irradiation (a repetition frequency of 10 to 100 Hz, energy density of 400 to 500 mJ/cm<sup>2</sup>) is conducted to crystallize the semiconductor film in an atmosphere containing oxygen. (FIG. 2C)" (column 10, lines 45-48). Further, Miyairi discloses that "next, the oxide film 34 is removed. (FIG. 2D). Then, laser light (second laser light) is irradiated to the semiconductor film 33a having a

crystalline structure in a nitrogen atmosphere or in a vacuum" (column 11, lines 25-28). That is, Miyairi discloses sequential steps of irradiating the semiconductor film, not a concurrent ordering of steps. For that matter, an intervening step of removing the oxide film takes place in Miyairi; hence, the Official Action has failed to sufficiently demonstrate that Miyairi discloses irradiating a surface with a second laser beam concurrently with an elongated beam.

Therefore, the Applicant respectfully submits that Miyairi does not teach irradiating the surface with a second laser beam concurrently with the elongated beam, either explicitly or inherently.

Since Miyairi does not teach all the elements of the independent claims, either explicitly or inherently, an anticipation rejection cannot be maintained. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102 are in order and respectfully requested.

The Official Action rejects claim 11 as obvious based on U.S. Patent No. 6,803,296 to Miyairi. The Official Action rejects claims 12, 13, 15, 17-21, 23 and 24 as obvious based on the combination of Miyairi and U.S. Patent No. 6,806,498 to Taketomi. The Official Action rejects claim 16 as obvious based on the combination of Miyairi, Taketomi and U.S. Patent No. 5,891,754 to Ishihara. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2142-2144.04, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some reason to do so found

either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The prior art, either alone or in combination, does not teach or suggest all the features of the independent claims. Independent claims 12, 13, 18 and 19 recite, among other features, irradiating a non-single crystalline semiconductor film with a first laser beam, where the first laser beam is a harmonic wave of a solid laser, and irradiating the non-single crystalline semiconductor film with a second laser beam, the second laser beam having a fundamental wave emitted from a solid laser. For the reasons provided below, Miyairi, Taketomi and Ishihara, either alone or in combination, do not teach or suggest the above-referenced features of the present invention.

It is initially noted that rather than presenting an element-by-element analysis of the features of each of the independent claims, the Official Action merely incorporates the language of the claims, in their entirety and without relevant explanation, and cites Embodiment Mode 2 of Miyairi, in its entirety and without specific details.

This manner of asserting a general, non-specific, rejection does not support a *prima facie* case of obviousness and disregards MPEP § 706.02(j), which states that "it is important that the written record clearly explain the rationale for decisions made during prosecution of the application" and requires Examiners to include the following in each rejection under 35 USC § 103:

- (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,
- (B) the difference or differences in the claim over the applied reference(s),
- (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and

(D) an explanation as to why the claimed invention would have been obvious to one of ordinary skill in the art at the time the invention was made.

The Official Action asserts that Miyairi discloses “shaping a first laser beam emitted from a laser oscillator... wherein said [first] laser beam is a [harmonic] of a solid laser” (Paper No. 20090616, page 5) and “a second laser beam emitted from a second laser oscillator, said second laser beam having a fundamental wave emitted from a solid laser” (Id., page 6). The Applicant respectfully disagrees and traverses the above assertions of the Official Action.

It is respectfully submitted that Miyairi does not disclose that a first laser beam is a harmonic of a solid laser and that a second laser beam is a fundamental wave. Specifically, Miyairi discloses that a second laser light is “the second harmonic (532 nm) or the third harmonic wave (355 nm) of the Nd:YVO<sub>4</sub> laser” (Miyairi, column 11, lines 50-53). Therefore, it is respectfully submitted that Miyairi does not teach or suggest irradiating the non-single crystalline semiconductor film with a second laser beam, the second laser beam having a fundamental wave emitted from a solid laser

Taketomi and Ishihara do not cure the deficiency of Miyairi. Taketomi is relied on by the Official Action to disclose “a semiconductor film with... the laser beam is melted.” Ishihara is relied on to teach the features of dependent claim 16. However, Taketomi and Ishihara do not disclose irradiating the non-single crystalline semiconductor film with a second laser beam, the second laser beam having a fundamental wave emitted from a solid laser. Specifically, Taketomi discloses “as an alternative to the XeCl excimer laser 531, various other lasers having a wavelength of 400 nm or less, such as an ArF, KrF, or XeF excimer laser may be employed, and as an alternative to the Ar laser 532, various other lasers having a wavelength of 450-550 nm may be employed” (column 53, lines 59-64). That is, it is respectfully submitted that Taketomi merely discloses a gas laser, not a solid laser having a fundamental wave. Hence, Miyairi, Taketomi, Ishihara, either alone or in combination, do not teach or suggest irradiating

the non-single crystalline semiconductor film with a second laser beam, the second laser beam having a fundamental wave emitted from a solid laser.

Therefore, the Applicant respectfully submits that Miyairi, Taketomi and Ishihara either alone or in combination, do not teach or suggest that a first laser beam is a harmonic of a solid laser and that a second laser beam is a fundamental wave and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

The Commissioner is hereby authorized to charge fees under 37 C.F.R. §§ 1.16, 1.17, 1.20(a), 1.20(b), 1.20(c), and 1.20(d) (except the Issue Fee) which may be required now or hereafter, or credit any overpayment to Deposit Account No. 50-2280.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

  
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